

REMARKS

Applicant would like to thank the Examiner for the careful consideration given the present application. The application has been carefully reviewed in light of the Office action, and amended as necessary to more clearly and particularly describe the subject matter which applicant regards as the invention.

The Examiner rejected claims 1, 4, 5, 8, and 9 under 35 U.S.C. 103(a) as being unpatentable over JP 2002-302026 in view of JP 2000-006759, and in further view of Midorikawa, U.S. Pat. No. 6,332,629 and Eiji JP 2000-225921. The Examiner's rejection is traversed for the following reason.

In regards to claim 1, claim 1 has been amended to further differentiate claim 1 from the cited prior art. Specifically, claim 1 has been amended to further define a function of the automatic brake unit. Support for this amendment can be found, for example, on page 25, line 24 through page 26, line 14 and in FIG. 8.

Accordingly, claim 1 recites a travel safety device for a vehicle that includes an object detecting unit, which detects an object traveling in the same direction as the vehicle, a correlation calculating unit, which calculates a correlation relating to the distance between the vehicle and the object based on the detection result of the object detecting unit, a safety unit, and a safety device operation control unit. The safety unit device includes an automatic brake unit, which automatically decelerates the vehicle, and a seatbelt device, which automatically tightens and releases the seatbelt. The safety device operation control unit determines the possibility of contact between the vehicle and the object based on the correlation calculated by the correlation calculating unit. Also, in the event that there is a possibility of a

contact between the vehicle and the object, the safety device operation control unit simultaneously actuates the automatic brake unit and seatbelt device. Thus, the brake unit and the seatbelt device act simultaneously when there is a possibility of contact between the vehicle and the object.

In addition, when the distance between the vehicle and the object enters a predetermined range based on the correlation calculated by the correlation calculating unit, the automatic brake unit causes the vehicle to decelerate in such a manner that the occupant recognizes that a braking force increases in a stepwise manner. Further, the seatbelt device alternates between tightening and releasing the seatbelt in response to the signal output by the correlation calculating unit such that a time period of tightening the seatbelt is longer than a time period of releasing the seatbelt.

Thus, the travel safety device of amended claim 1 has the following advantages:

1) Referring to page 2, line 21 to page 3, line 9, because the safety device actuates the automatic brake unit and the seatbelt device in the event of possible contact with an object, the occupants are alerted to recognize that the possibility of contact exists. Thus, the occupant can possibly perform an operation to avoid the contact.

2) Referring to page 4, lines 4 to 13, because the occupant securely recognizes the deceleration and seatbelt operation, the seatbelt operation functions as an alarm which allows the occupant to recognize the situation without fail.

3) Referring to page 4, lines 4 to 18, the deceleration generated by the automatic brake unit increases in a stepwise manner, which Applicant respectfully

contends is not taught by the cited prior art, when the distance between the vehicle and the object enters a predetermined range. In other words, the occupant bodily senses an increasing stepwise deceleration indicating that a state where the distance between the vehicle and the object enters a predetermined range is maintained.

Accordingly, Applicant respectfully contends that JP 2002-302026, JP 2000-006759, Midorikawa, Eiji or the combination thereof do not teach all the features of amended claim 1. Specifically, Applicant respectfully contends that JP 2002-302026, JP 2000-006759, Midorikawa, Eiji or the combination thereof do not teach "...the automatic brake unit causes generation of a deceleration to a degree, which is capable of allowing the occupant to recognize that a braking force has been increasing in a stepwise manner."

JP 2002-302026 discloses a drive supporting device for a vehicle that includes an avoidance operation judging means, a brake driving means to operate the brakes, a control means to control the brake driving means, and a warning means to warn the driver of an impending collision with another vehicle. Referring to paragraphs [0014] through [0017], JP 2002-302026 teaches that the variation of the brake control is divided into three modes. The first mode refers to drawing 2 and determines the distance between two cars and continuously engages the brakes until the vehicle stops. The second mode refers to drawing 3 and determines the distance between two cars and reduces the speed of the vehicle to approximately 70% of the initial vehicle speed. The third mode refers to drawing 4 and intermittently applies the brakes to gain the driver's attention. JP 2002-302026, however, does not disclose that the braking operation causes the deceleration to

increase in a stepwise manner, as defined in claim 1.

JP 2000-006759 discloses an occupant constraining device for a vehicle that includes a dozy driver detection section and a risk degree judgment section. The dozy detection section detects when the vehicle steers off course and transmits a signal to the risk degree judgment section. The risk degree judgment section drives a motor to fluctuate (tighten and loosen) a seatbelt to warn the occupant of an impending collision. The degree of fluctuation increases as the risk of danger increases. JP 2000-006759, however, does not disclose a braking operation. Thus, JP 2000-006759 does not disclose a braking operation causing a deceleration to increase in a stepwise manner, as defined in claim 1.

Midorikawa discloses a seatbelt device with a locking retractor. Referring to column 16, lines 28-35, the seatbelt device includes a collision predictor 403. The collision protector 403 measures the distance to an obstacle and calculates the time until the collision occurs. The collision protector, however, does not disclose a braking operation. Thus, Midorikawa does not disclose a braking operation causing a deceleration to increase in a stepwise manner, as defined in claim 1.

Eiji discloses an occupant restraint and protection device that includes an occupant seat belt setting system. The occupant seat belt setting system adjusts the seat belt to accommodate specific traits of an occupant. The occupant seat belt setting system stores the traits of the occupant and adjusts the seat belt accordingly. For example, based on the occupant trait information the occupant seat belt setting system may adjust the roll-up characteristic of the seat belt, the height of the shoulder adjuster, etc., see paragraphs [0017] through [0020]. The occupant seat belt setting system includes various modes including a comfort mode (paragraph

[0029]), a warning mode (paragraph [0030]), and a child seat detection mode (paragraph [0031]). Referring to paragraph [0030], the occupant seat belt setting system adjusts the seat belt tension of the seat belt in the event of an impending collision. The occupant seat belt setting system detects an object, either moving or stationary, in the path of the vehicle and tightens the seat belt based on the traits of the occupant. Further, the occupant seat belt setting system can also warn the driver if the driver has fallen asleep. Still further, the occupant seat belt setting system can also tighten the seat belt when a sharp turn is encountered. Eiji, however, does not disclose a braking operation. Thus, Eiji does not disclose a braking operation causing a deceleration to increase in a stepwise manner, as defined in claim 1.

Based on the foregoing, it is apparent that JP 2002-302026, JP 2000-006759, Midorikawa, Eiji or the combination thereof, do not teach all the features of claim 1. Thus, reconsideration and withdrawal of the rejections of claim 1 based upon the JP 2002-302026, JP 2000-006759, Midorikawa, and Eiji references are hereby requested.

Claims 4, 5, and 8 depend from claim 1, thus, all arguments pertaining to claim 1 are equally applicable to these claims and are herein incorporated by reference.

Claim 9 has been cancelled.

The Examiner rejected claims 6 and 7 under 35 U.S.C. 103(a) as being unpatentable over the combination of JP 2002-302026 in view of JP 2000-006759 and Midorikawa, U.S. Pat. No. 6,332,629 (hereinafter "Midorikawa ('629)"), as applied to claims 1, 4, 5, and 8 above, and in further view of Midorikawa, GB

2,373,220 (hereinafter "Midorikawa ('220)"). The Examiner's rejection is traversed for the following reason.

Claims 6 and 7 depend from claim 1, thus, all arguments pertaining to claim 1 are equally applicable to these claims and are herein incorporated by reference.

Further, Applicant submits that Midorikawa ('220) does not correct or eliminate the deficiencies of the combination of JP 2002-302026, JP 2000-006759, and Midorikawa ('629) as they relate to claim 1. Midorikawa ('220) discloses an automotive restraint and protection system. More specifically, Midorikawa ('220) discloses an automotive restraint and protection system that includes a seatbelt and a seatbelt driving means, such as a motor, able to protract or retract the seatbelt. The system further includes a warning means that signals the controller of the seatbelt motor if a collision danger status has been predicted. If the collision danger status has been set, the seatbelt is alternately protracted and retracted thus applying periodically increasing and decreasing pressure on the seatbelt wearer, thereby alerting the wearer of an impending collision. Midorikawa ('220), however, does not disclose a braking operation and, thus, does not teach a braking operation causing a deceleration to increase in a stepwise manner, as defined in claim 1. Thus, Midorikawa ('220) does not correct or eliminate the deficiencies of the combination of JP 2002-302026, JP 2000-006759, and Midorikawa ('629) as they relate to claim 1.

The Examiner rejected claim 10 under 35 U.S.C. 103(a) as being unpatentable over the combination of JP 2002-302026, JP 2000-006759, and Midorikawa U.S. Pat. No. 6,332,629 as applied to claims 1, 4, 5, and 8 above, and in further view of McFarland U.S. Pat. No. 6,701,849 . The Examiner's rejection is

traversed for the following reason.

Claim 10 depends from claim 1, thus, all arguments pertaining to claim 1 are equally applicable to claim 10 and are herein incorporated by reference.

Further, Applicant submits that McFarland does not correct or eliminate the deficiencies of the combination of JP 2002-302026, JP 2000-006759, and Midorikawa, as they relate to claim 1. McFarland discloses an inflator for providing inflation fluid for inflating a vehicle protection device. McFarland, however, does not disclose a braking operation and, thus, does not teach a braking operation causing a deceleration to increase in a stepwise manner, as defined in claim 1. Thus, McFarland does not correct or eliminate the deficiencies of the combination of JP 2002-302026, JP 2000-006759, and Midorikawa, as they relate to claim 1.

In regards to new claim 15, the travel safety device of claim 15 has the following advantages:

1) Referring to page 2, line 21 to page 3, line 9, because the safety device actuates the automatic brake unit and the seatbelt device in the event of possible contact with an object, the occupants are alerted to recognize that the possibility of contact exists. Thus, the occupant can possibly perform an operation to avoid the contact.

2) Referring to page 4, lines 4 to 13, because the occupant securely recognizes the deceleration and seatbelt operation, the seatbelt operation functions as an alarm which allows the occupant to recognize the situation without fail.

3) Referring to page 4, lines 14 to 23, if the distance between the vehicle and the object enters a predetermined range for a predetermined period of time, the automatic brake unit increases the deceleration. Thus, in the event that contact

occurs the damage can be reduced.

4) Referring to page 4, line 24 to page 5, line 12, if the distance between the vehicle and the object enters a predetermined range for a predetermined period of time, the seatbelt device causes the seatbelt to remain fixed in its stopped position to prevent forward movement of the occupant when the deceleration increases. Thus, the occupant will be in a favorable posture to perform an operation to prevent contact with the object.

5) Referring to page 29, line 23 to page 30, line 16, in a tightening operation of the seatbelt, the current of the motor is increased such that the slack of the seatbelt is immediately removed, thereby generating tension in the seatbelt, which Applicant respectfully contends is not taught by the cited prior art. Thus, the posture of the occupant is in a favorable position when the automatic brake unit increases the deceleration. This assists the occupant in performing an operation to avoid contact.

Accordingly, Applicant respectfully contends that the cited prior art, whether alone or in combination, does not teach all the features of claim 15. Specifically, the cited prior art, whether alone or in combination, does not teach "in a tightening operation of the seatbelt, a current value of the electric motor is temporarily increased by setting the current limit to a predetermined initial limit value for a predetermined initial time immediately after rotation of the electric motor is commenced to remove slack in the seatbelt, and the current limit thereafter is set to a predetermined limit value which is lower than the initial limit value to lower the current value, and the tension of the predetermined value is generated for the seatbelt."

In regards to new claim 16, the travel safety device has the following advantages:

1) Referring to page 2, line 21 to page 3, line 9, because the safety device actuates the automatic brake unit and the seatbelt device in the event of possible contact with an object, the occupants are alerted to recognize that the possibility of contact exists. Thus, the occupant can possibly perform an operation to avoid the contact.

2) Referring to page 4, lines 4 to 13, because the occupant securely recognizes the deceleration and seatbelt operation, the seatbelt operation functions as an alarm which allows the occupant to recognize the situation without fail.

3) Referring to page 4, lines 14 to 23, if the distance between the vehicle and the object enters a predetermined range for a predetermined period of time, the automatic brake unit increases the deceleration. Thus, in the event that contact occurs the damage can be reduced.

4) Referring to page 4, line 24 to page 5, line 12, if the distance between the vehicle and the object enters a predetermined range for a predetermined period of time, the seatbelt device causes the seatbelt to remain fixed in its stopped position to prevent forward movement of the occupant when the deceleration increases. Thus, the occupant will be in a favorable posture to perform an operation to prevent contact with the object.

5) Referring to page 5, line 13 to page 6, line 3, the seatbelt, when in its fixed stopped state, is released when a braking operation is carried out by the driver and the vehicle is stopped, which Applicant respectfully contends is not taught by the cited prior art. Thus, the safety device operation control unit does not require a reset

switch. Therefore, removing the seatbelt is easy when the occupant evacuates the vehicle.

Accordingly, Applicant respectfully contends that the cited prior art, whether alone or in combination, does not teach all the features of claim 16. Specifically, the cited prior art, whether alone or in combination, does not teach "the seatbelt fixed in its stopped state by the seatbelt device is released in at least one of the states where it is detected based on a detection result of the braking operation detecting unit that a braking operation is released after the braking operation is carried out by a driver and where it is detected based on a detection result of the vehicle speed detecting unit that the vehicle stops."

In regards to new claim 17, the travel safety device has the following advantages.

1) Referring to page 2, line 21 to page 3, line 9, because the safety device actuates the automatic brake unit and the seatbelt device in the event of possible contact with an object, the occupants are alerted to recognize that the possibility of contact exists. Thus, the occupant can possibly perform an operation to avoid the contact.

2) Referring to page 4, lines 4 to 13, because the occupant securely recognizes the deceleration and seatbelt operation, the seatbelt operation functions as an alarm which allows the occupant to recognize the situation without fail.

3) Referring to page 4, lines 14 to 23, if the distance between the vehicle and the object enters a predetermined range for a predetermined period of time, the automatic brake unit increases the deceleration. Thus, in the event that contact occurs the damage can be reduced.

4) Referring to page 4, line 24 to page 5, line 12, if the distance between the vehicle and the object enters a predetermined range for a predetermined period of time, the seatbelt device causes the seatbelt to remain fixed in its stopped position to prevent forward movement of the occupant when the deceleration increases. Thus, the occupant will be in a favorable posture to perform an operation to prevent contact with the object.

5) Referring to page 3, lines 10 to 21, the deceleration and seatbelt actuation may be different when an alarm is issued to the occupant and when contact with an object is prevented. Thus, the deceleration and tightening of the seatbelt may be different in accordance with the degree of emergency.

6) Referring to page 8, line 23 to page 9, line 23, because the airbag devices can be actuated by the collision sensor's detecting a collision of the vehicle after the automatic brake unit decelerates the vehicle and the seatbelt device tightens the seatbelt, the vehicle is adequately decelerated and the occupant is restrained when the airbag devices operate. Thus, the size of the airbag devices can be reduced.

Accordingly, Applicant respectfully contends that the cited prior art, whether alone or in combination, does not teach all the features of claim 17. Specifically, the cited prior art, whether alone or in combination, does not teach "when such a state is maintained for a predetermined period of time, where the distance between the vehicle and the object enters a predetermined range, an even higher degree of deceleration is generated by the automatic brake unit, and the seatbelt device causes the seatbelt to be fixed in its stopped state for at least a predetermined period of time after the seatbelt is tightened, and actuates the airbag devices when

the collision sensor detects the collision of the vehicle."

In light of the foregoing, it is respectfully submitted that the present application is in a condition for allowance and notice to that effect is hereby requested. If it is determined that the application is not in a condition for allowance, the Examiner is invited to initiate a telephone interview with the undersigned attorney to expedite prosecution of the present application.

If there are any additional fees resulting from this communication, please charge same to our Deposit Account No. 18-0160, our Order No. SHG-16197.

Respectfully submitted,

RANKIN, HILL & CLARK LLP

By /Ronald S. Nolan/
Ronald S. Nolan, Reg. No. 59,271
Patent Agent

38210 Glenn Avenue
Willoughby, Ohio 44094-7808
(216) 566-9700